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HEWLETT-PACKARD COMPANY
Intellectual Property Administration
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OIPE IAP39 DEC 1 5 2008 PATENT & TRADEMARK OFFICE

PATENT APPLICATION

ATTORNEY DOCKET NO. 10991796-2

IN THE
UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Bruce W. Melvin et al.
Confirmation No.: 2572

Application No.: 10/730,390
Examiner: Candal Elpenord

Filing Date: December 8, 2003
Group Art Unit: 2616

Title: METHOD AND SYSTEM FOR OUTPUT FLOW CONTROL IN NETWORK MULTIPLEXERS

Mail Stop Appeal Brief-Patents
Commissioner For Patents
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Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on Oct. 9, 2008.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) $500.00.

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)-(d)) for the total number of months checked below:

☐ 1st Month $120 ☐ 2nd Month $450 ☐ 3rd Month $1020 ☐ 4th Month $1590

☐ The extension fee has already been filed in this application.

☒ (b) Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account 08-2025 the sum of $ 540. At any time during the pendency of this application, please charge any fees required or credit any over payment to Deposit Account 08-2025 pursuant to 37 CFR 1.25. Additionally please charge any fees to Deposit Account 08-2025 under 37 CFR 1.16 through 1.21 inclusive, and any other sections in Title 37 of the Code of Federal Regulations that may regulate fees.

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Typed Name: Joanne Bourguignon

Signature: Joanne Bourguignon

Respectfully submitted,

Bruce W. Melvin et al.

By Robert W. Bergstrom

Robert W. Bergstrom

Attorney/Agent for Applicant(s)

Reg No. : 39,906

Date : December 9, 2008

Telephone : 206.621.1933

Rev 10/06a (AplBrief)

OIPE IAP39
DEC 1 5 2008
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HEWLETT-PACKARD COMPANY
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P.O. Box 272400
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Rev 10/06a (AplBrief)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:

Applicants	:	Bruce W. Melvin et al.
Application No.	:	10/730,390
Filed	:	December 8, 2003
For	:	METHOD AND SYSTEM FOR OUPUT FLOW CONTROL IN NETWORK MULTIPLEXERS

Examiner	:	ELPENORD, Candal
Art Unit	:	2616
Docket No.	:	10991796-2
Date	:	December 9, 2008

APPEAL BRIEF

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Alexandria, VA 22313-1450

Sir:

This appeal is from the decision of the Examiner, in an Office Action mailed July 9, 2008, finally rejecting claims 1-10.

REAL PARTY IN INTEREST

The real party in interest is Hewlett-Packard Development Company, LP, a limited partnership established under the laws of the State of Texas and having a principal place of business at 20555 S.H. 249 Houston, TX 77070, U.S.A. (hereinafter "HPDC"). HPDC is a Texas limited partnership and is a wholly-owned affiliate of Hewlett-Packard Company, a Delaware Corporation, headquartered in Palo Alto, CA. The general or managing partner of HPDC is HPQ Holdings, LLC.

RELATED APPEALS AND INTERFERENCES

Appellant's representative has not identified, and does not know of, any other appeals of interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

STATUS OF CLAIMS

Claims 1-10 are pending in the application. Claims 1-10 were finally rejected in the Office Action dated July 9, 2008. Appellants' appeal the final rejection of claims 1-10 which are copied in the attached CLAIMS APPENDIX.

STATUS OF AMENDMENTS

No Amendment After Final is enclosed with this brief. The last Response was filed March 27, 2008. The last amendment to the claims was filed August 29, 2007.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1

Claim 1 is directed to a method for initiating flow control (lines 3-7 of page 3; lines 6-7 of page 21; lines 13-20 of page 24; line 59 in Figure 14B; and line 106 in Figure 14C) in a network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) that forwards a message descriptor (lines 23-24 of page 1) referencing a communications packet received by a receiving port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) to one or more transmit queues (708 in Figure 7; line 26 of page 8 to line 14 of page 10), each transmit queue associated with a transmitting port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) which transmits communications packets queued to the transmit queue, the method comprising: (1) providing each transmitting port in the network multiplexer with a high threshold (lines 7-10 of page 15; 1314 in Figure 13A) and a low threshold (lines 7-10 of page 15; 1316 in Figure 13A); and (2) when a message descriptor is queued to a transmit queue associated with a transmitting port, (2a) when the transmit queue currently contains a maximum number of message descriptors, discarding the message descriptor (lines 27-29 of page 15), and (2b) when the transmit queue currently contains a number of message descriptors equal to or greater than the high threshold of the associated transmitting port,

sending a flow control request (line 29 of page 15 to line 3 of page 16) to the receiving port that received the communications packet referenced by the queued message descriptor.

Dependent Claims 2-5

Claim 2 is directed to the method of claim 1 that further includes, when a message descriptor (lines 23-24 of page 1) is queued to a transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of page 10) associated with a transmitting port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10), when the transmit queue currently contains a number of message descriptors greater than or equal to the low threshold (lines 7-10 of page 15; 1316 in Figure 13A) of the associated transmitting port, but the number of message descriptors contained in the transmit queue exceeded or equaled the high threshold (lines 7-10 of page 15; 1314 in Figure 13A) of the associated transmitting port more recently than the number of message descriptors contained in the transmit queue was equal to the low threshold of the associated transmitting port, sending a flow control request (line 29 of page 15 to line 3 of page 16) to the receiving port that received the communications packet referenced by the queued message descriptor. Claim 3 is directed to the method of claim 1 further including: when a transmitting port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) transmits a packet referenced by a message descriptor (lines 23-24 of page 1) to a destination port, releasing the message descriptor, and when the destination port currently contains a number of queued message descriptors equal to one less than the destination port's low threshold (lines 7-10 of page 15; 1316 in Figure 13A), sending a release flow control request (line 29 of page 15 to line 3 of page 16) to any receiving ports (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) to which a flow control request was sent while the transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of page 10) contained a number of message descriptors equal to or greater than the high threshold (lines 7-10 of page 15; 1314 in Figure 13A) of the associated transmitting port. Claim 4 is directed to the method of claim 2 further including: when a transmitting port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) transmits a packet referenced by a message descriptor (lines 23-24 of page 1) to a destination port, releasing the message descriptor, and when the destination port currently contains a number of queued message descriptors one less than the destination port's low threshold (lines 7-10 of page 15; 1316 in Figure 13A), sending a release flow control request (line 29 of page 15 to line 3 of page 16) to any receiving ports to which a flow control request was sent while the transmit queue (708 in Figure 7; line 26 of page 8 to line

14 of page 10) contained a number of message descriptors greater than or equal to the low threshold of the associated transmitting port. Claim 5 is directed to the method of claim 4 further including, when a receiving port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) is flow controlled (line 29 of page 15 to line 3 of page 16) and receives a number of release flow control requests equal to the number of received flow control requests, releasing flow control by the receiving port.

Independent Claim 6

Claim 6 is directed to a network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) system that links physically separate network media by forwarding packets received from each network medium to a number of network media, the network multiplexer system comprising: (1) a number of ports (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10), each port having a transceiver and a communications controller; (2) a memory (712 and 714 in Figure 7; lines 2-5 of page 9; 324 in Figure 3; line 22 of page 5 to line 6 of page 6); (3) an internal bus for transferring packets from ports to memory and from memory to ports (322 in Figure 3; line 22 of page 5 to line 6 of page 6); (4) a receive queue (710 in Figure 7; line 26 of page 8 to line 14 of page 10) and a transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of page 10) associated with each port that contain message descriptors (lines 23-24 of page 1) that each references a communications packet stored in memory (714 in Figure 7; lines 2-5 of page 9); (5) a high threshold (lines 7-10 of page 15; 1314 in Figure 13A) and a low threshold (lines 7-10 of page 15; 1316 in Figure 13A) associated with each transmit queue; (6) an indication of ports to which flow control requests (line 29 of page 15 to line 3 of page 16) have been made associated with each port (1318-1320 in Figure 13A; lines 18-26 of page 15); and (7) an indication of the number of flow control requests made to a port associated with each port (line 29 of page 15 to line 3 of page 16).

Dependent Claims 7-10

Claim 7 is directed to the network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) of claim 6 wherein, when a message descriptor (lines 23-24 of page 1) is forwarded to a port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) for transmission, and when the transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of

page 10) of the port is full, the message descriptor is dropped. Claim 8 is directed to the network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) of claim 6 wherein, when a message descriptor (lines 23-24 of page 1) is forwarded to a port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) for transmission, and when the transmit queue of the port contains a number of message descriptors greater than or equal to the high threshold (lines 7-10 of page 15; 1314 in Figure 13A) associated with the port, a flow control request is sent (line 29 of page 15 to line 3 of page 16) to the port that received the communications packet referenced by the message descriptor and a indication that a flow control request has been sent (line 29 of page 15 to line 3 of page 16) to the port that received the communications packet is saved by the port to which the message descriptor is forwarded. Claim 9 is directed to the network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) of claim 6 wherein, when a message descriptor (lines 23-24 of page 1) is forwarded to a port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) for transmission, and when the transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of page 10) of the port has contained a number of message descriptors greater than or equal to the high threshold (lines 7-10 of page 15; 1314 in Figure 13A) associated with the port more recently than the transmit queue of the port has contained a number of message descriptors less than the low threshold (lines 7-10 of page 15; 1316 in Figure 13A) associated with the port, a flow control request is sent (line 29 of page 15 to line 3 of page 16) to the port that received the communications packet referenced by the message descriptor and a indication that a flow control request has been sent to the port that received the communications packet is saved by the port to which the message descriptor is forwarded. Claim 10 is directed to the network multiplexer (lines 15-26 of page 1; 114 in Figure 1; 700 in Figure 7) of claim 6 wherein, when a port (702-707 in Figure 7; line 26 of page 8 to line 14 of page 10) removes a message descriptor from the transmit queue (708 in Figure 7; line 26 of page 8 to line 14 of page 10) associated with the port, and when the number of messages contained in the transmit queue currently equal one less than the low threshold (lines 7-10 of page 15; 1316 in Figure 13A) associated with the port, a release flow control message is sent (line 29 of page 15 to line 3 of page 16) to each port referenced by indications saved by the port.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. The rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over

Yamada et al., U.S. Patent No. 5,455,820 ("Yamada") in view of Homberg et al., U.S. Patent No. 6,661,802 ("Homberg").

2. The rejection of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Homberg and further in view Chiussi et al., U.S. Patent No. 5,701,292 ("Chiussi").

3. The rejection of claims 1, 6-9, and 10 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern et al., U.S. Patent No. 6,614,756 ("Morgenstern") in view of Robles et al., U.S. Patent No. 6,282,172 ("Robles").

4. The rejections of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern in view of Robles and in further view of Chiussi.

ARGUMENT

Claims 1-10 are pending in the current application. In an office action dated July 9, 2008 ("Office Action"), the Examiner finally rejected claim 1 under 35 U.S.C. §103(a) as being unpatentable over Yamada et al., U.S. Patent No. 5,455,820 ("Yamada") in view of Homberg et al., U.S. Patent No. 6,661,802 ("Homberg"), rejected claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Homberg and further in view Chiussi et al., U.S. Patent No. 5,701,292 ("Chiussi"), rejected claims 1 and 6-10 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern et al., U.S. Patent No. 6,614,756 ("Morgenstern") in view of Robles et al., U.S. Patent No. 6,282,172 ("Robles"), and rejected claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern in view of Robles and further in view of Chiussi. Appellants respectfully traverse these 35 U.S.C. §103(a) rejections.

ISSUE 1

1. <u>The rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Yamada et al., U.S. Patent No. 5,455,820 ("Yamada") in view of Homberg et al., U.S. Patent No. 6,661,802 ("Homberg").</u>

Overview of the Currently Claimed Subject Matter

A network multiplexer is described in the current application, beginning on line 15 of page 1, as follows:

> Bridges, switches, and routers are types of network multiplexers that receive communications packets, also called messages, from network media, such as ethernets, and forward the received communications packets to one or more network media. Network multiplexers serve to link physically separate network media into a single network. A network multiplexer contains a number of ports through which separate physical network media are coupled to the network multiplexer. Each port is associated with a receive queue that contains message descriptors pointing to memory locations in which received communications packets are stored, and are associated with transmit queues containing message descriptors that point to communications packets stored in memory for transmission by the port. A network multiplexer forwards received communications packets by moving message descriptors from receive queues to transmit queues.

One embodiment of the current invention is thoroughly and clearly illustrated in Figures 13A-J, and discussed in the current application beginning on line 3 of page 15. Figure 13 shows three receive queues, or input queues, 1302-1304, and three transmit queues, or output queues, 1306-1308, within a network multiplexer. Each queue is shown having at least eight queue entries for at least eight different packets, or messages, although, in practical embodiments, input and output queues may have far larger capacities. Each queue is associated with a communications port that includes a transceiver. As discussed in the current application, Figures 13A-J are abstractions of a network multiplexer, since, in a network multiplexer, as shown in Figure 7 of the current application, each communications port is associated with both a receive queue and a transmit queue. Each output queue 1306-1308 is associated with a high-threshold value (1314 for output queue 1306) and a low-threshold value (1316 for output queue 1306). Each input queue, or receive queue, is associated with a bit array, in the embodiment discussed with reference to Figures 13A-J, such as bit array 1318 associated with input queue 1302. Each bit in the bit array represents a different one of the three output queues 1306-1308. When a bit in the bit array is set to Boolean value "1," the receive queue has received a flow-control directive from the corresponding transmit queue. As clearly summarized in the summary-of-the-invention section of the current application, beginning on line 30 of page 2:

> If the number of queued message descriptors in a transmit queue exceeds the high threshold, any port thereafter attempting to queue additional message descriptors to the transmit queue are directed by the port associated with the transmit queue to ***undertake flow control on their associated network media in order to temporarily prevent reception of additional communications packets.*** Once the number of message descriptors queued to the transmit queue falls below the low threshold, all ports to which the port associated with the transmit queue has sent flow control directives are sent release flow control messages so that these ports can discontinue flow control and resume receiving communications packets. A flow controlled port remains flow controlled until all outstanding flow control directives have been removed by subsequent release flow control messages. (emphasis added)

Thus, flow control refers to blocking a communications medium, or external devices connected to the communications medium, from sending further packets to the port until the flow-control is released.

In Figure 13A, each of the input queues 1302-1304 is filled with packets, labeled "A," "B," and "C," for input queues 1302, 1303, and 1304, respectively. Additional, received packets are shown, in Figure 13B, by the capital letters "A," "B," and "C," associated with arrows representing input to input ports, such as arrow 1330. At the point in time represented in Figure 13C, transmit queue 1306 contains ten packets, or messages, and thus has reached the high-threshold value (1314 in Figure 13C) of "10." Therefore, the transmit queue indicates to input queue 1302, from which the last message was received by transmit queue 1306, that it does not wish to receive further messages. Accordingly, as shown in Figure 13D, a "1" value is placed in the bit array 1318 associated with input queue 1302 to indicate that the port associated with input queue 1302 should be flow controlled. As discussed in the current application, once the bit has been set, as shown in Figure 13E, the port is allowed to receive two more messages before, as shown in Figure 13F, input to the port associated with input queue 1302 is halted. As discussed in the current application, this additional number of received messages following a directive to flow control the port is computed so that the medium to which the port is connected has time to discontinue message transmission, without dropping any already sent messages or messages being transmitted at the time that flow-control is exercised. Flow-control directives are also sent to the ports associated with input queue 1303, as shown in Figure 13F, since both output queues 1306 and 1307 have exceeded the high-threshold value of "10." When the number of messages queued to output queue 1306 falls below the low-threshold value (1316 in Figure 13G), then the ports

associated with input queues 1302 and 1303 receive flow-resumption directives from the port associated with output queue 1306, as indicated by the clearing of the bits corresponding to output queue 1306 in the bit fields, such as bit-array 1318, associated with input queues 1302 and 1303. After a period of time, message reception resumes through the port associated with input queue 1302, as shown in Figure 13I. When the number of messages queued to output queue 1307 falls below the minimum-threshold value (1340 in Figure 13I), then flow-control is released with respect to input queue 1303, as shown in Figure 13I by the clearing of the bit 1337 associated with output queue 1307, and message reception resumes through the port associated with input queue 1303, as shown in Figure 13J.

Argument

In rejecting claim 1, the Examiner states: "Yamada et al. discloses a method for initiating flow control ('Outputting a buffer occupancy level including a state signal', recited in col. 3, lines 40-52) in a network multiplexer (fig. 1-3, ATM Switch, recited in col. 3, lines 18-34)." This statement is incorrect. The phrase "flow control" is not, as suggested by the Examiner, an arbitrary phrase that can be applied to "outputting a buffer occupancy level including a state signal." The phrase "flow control" has a very well known and well understood meaning in networking and computer science. The phrase "flow control" refers to a push-back technique by which a receiving device causes a transmitting device to discontinue transmitting signals or messages to the receiving device for some period of time.

The phrase "flow control" is used repeatedly and consistently with this meaning in the current application. For example, in the background-of-the-invention section of the current application, beginning on line 13 of page 2, the current application states: "Such problems can be avoided by individually gating reception of communications packets via ports using network-hardware or network-protocol level flow control techniques." In the summary-of-the-invention section of the current application, beginning on line 30 of page 2, the current application states: "If the number of queued message descriptors in a transmit queue exceeds the high threshold, any port thereafter attempting to queue additional message descriptors to the transmit queue are directed by the port associated with the transmit queue to undertake flow control on their associated network media in order to temporarily prevent reception of additional communications packets." In other words, when flow control is applied, transmission of packets by transmitting devices is blocked, or temporarily discontinued.

Flow control can also be released. For example, beginning on line 3 of page 3 of the current application, the current application states: "Once the number of message descriptors queued to the transmit queue falls below the low threshold, all ports to which the port associated with the transmit queue has sent flow control directives are sent release flow control messages so that these ports can discontinue flow control and resume receiving communications packets."

Many additional references to flow control are contained in the current application. Beginning on line 6 of page 13 of the current application, the current application states: "In Figure 11, flow control has been applied to the network medium associated with receive queue 1002 in an attempt to prevent additional reception of communications packets through receive queue 1002 and thus prevent additional packet loss. With receive queue 1002 essentially halted, . . ." Beginning on line 25 of page 13 of the current application, the current application states: "This solution is based on the ability of ports to undertake flow control at either the hardware or network protocol level in order to prevent, for a period of time, transmission of communications packets to the port via the network medium connected to the port." Beginning on line 29 of page 15 of the current application, the current application states: "When a source attempts to queue a message descriptor to a transmit queue already containing a number of message descriptors greater than the high threshold, then the transmit queue sends a flow control directive to the source to direct the source to employ hardware or protocol-level flow control procedures in order to temporarily prevent reception of additional communications packets by the source." Beginning on line 6 of page 18, the current application states: "In the current implementation, once a source receives a flow control directive, it may transfer an additional two already-queued message descriptors to transmit queues and may, in turn, receive an additional two communications packets prior to successfully terminating reception of communications packets via hardware or protocol-level flow control. Although two additional transfers are allowed and two additional receptions may be anticipated in the current example, the maximum number of additional communications packets that may arrive at a port following initiation of flow control is a function of the latency or response time of the flow control mechanism employed for the network medium associated with a given port." Beginning on line 18 of page 18 of the current application, the current application states: "Thus, in Figure 13E, source 1302 has received an additional two communications packets before flow control prevented additional communications packets from arriving at source 1302 . . ." Beginning on line 22 of page 18

of the current application, the current application states: "By accounting for the number of message descriptors that can be transferred from a source after the source receives a flow control directive, the network multiplexer can guarantee that no message descriptors will be discarded . . ."

In describing the phrase "transmit flow control," the Wikipedia on-line encyclopedia describes transmit flow control as follows:

> Hardware flow control typically works by the DTE or master end first raising or asserting its line, such as RTS, which signals the opposite end (the slave end such as a DCE) to beginning monitoring its data input line. When ready for data, the slave end will raise its complementary line, CTS in this example, which signals the master to start sending data, and for the master to begin monitoring the slave's data output line. If either end needs to stop the data, it lowers its respective line.

In describing the phrase "ethernet flow control," the Wikipedia on-line encyclopedia states:

> Ethernet is a specific computer network protocol. Flow control in Ethernet resides in the data link layer. A situation may arise when a sending station (computer) may be transmitting data faster than some other part of the network (including the receiving station) can accept it. The overwhelmed network element will send a PAUSE frame, which halts the transmission of the sender for a specified period of time.

It is clear that the phrase "flow control" refers to a method, carried out by software, hardware, or both software and hardware, for stopping transmission of signals or messages from one or more transmitting devices to a receiving device through a communications medium. In Ethernet, flow control is accomplished by sending a PAUSE message, as discussed in the above quote from Wikipedia, which is a software/hardware mechanism for stopping transmission of messages from a transmitting node or other computational entity. In the preceding, quoted discussion of flow control in a master/slave hardware environment, flow control is accomplished in hardware, by de-asserting a signal line, which causes a transmitting entity to stop transmitting data to the receiving entity. Throughout the current application, the phrase "flow control" is used consistently with this well-known and well-understood meaning of the phrase "flow control" in computer science, networking, and other related fields.

On page 3 of the office action, the Examiner states:

> The applicant alleged that the buffer occupancy signal sent when the buffer occupancy rises above the pre-determined threshold is not equivalent to a flow control request.

> In response, the Examiner would like to remind the Applicant that sending a report condition to the input buffers when the occupancy of the output buffer exceeds the predetermined threshold as suggested in col. 4, lines 33-38 is equivalent to flow control request.

The Examiner provides no support for this purely conclusory and incorrect re-definition of the phrase "flow control." The phrase "flow control" does not mean "sending a report condition to the input buffers when the occupancy of the output buffer exceeds the predetermined threshold." The phrase "flow control" has nothing to do with sending reports. On lines 33-38 of column 4 of Yamada, Yamada states:

> In response, the calculator 320 calculates an occupancy ratio of the cell buffer 330 and compares it with a predetermined threshold. If the calculated occupancy ratio is greater than a predetermined threshold, the calculator 320 reports such a condition to all the input buffers 100_1-100_N over a signal line 50.

Yamada, in this passage, is referring to components (320 and 330) of an output buffer section (300 in Figure 2) which is, as shown in Figure 1, a component of "an output buffer switch for ATM embodying the present invention." The fact that one component of the ATM switch sends a signal to another component of the ATM switch obviously has nothing whatsoever to do with flow control. The signal is sent from one component of the ATM switch to another, and is not sent from an external transmitting device in order to cause that external transmitting device to stop sending signals or messages. In other words, as discussed above, flow control involves one device pushing back on another device or devices to prevent the other device of devices from transmitting additional signals and messages. The passage cited by the Examiner involves a signal internal to a single ATM switch, and makes no reference to shutting down transmission of signals or data as a result of the signal being transmitted. The signal is simply a report of a threshold-exceeded condition. Flow control is not reporting a condition. Flow control is halting transmission of data.

Furthermore, Yamada explicitly states that, by providing a sufficient number of buffers, Yamada's ATM switch does not ever experience a buffer-overflow condition that would require flow control. In Yamada, as clearly stated by Yamada in the cited passage of lines 40-47 of column 3, each output buffer section includes "a buffer occupancy ratio calculator 320 for calculating an occupancy ratio of the cell buffer and outputting a signal representative of the calculated ratio, i.e., a buffer occupancy state signal, to all input buffer sections when the buffer occupancy ratio has exceeded a predetermined threshold." This is

not a flow-control request. As further stated by Yamada, beginning on line 53 of column 3: "In each input buffer section 100, the buffer controller 120 includes control means for using, when the buffer occupancy state signal is absent, only one of the cell buffers 140_1-140_3." However, when an output buffer begins to overflow, packets or messages, referred to as "cells" in ATM networking, are buffered, first in the output buffer, and then in the input buffer, so that no cells are ever discarded, as described in the paragraph beginning on line 50 of column 4:

> The procedure of FIG. 4(*a*) begins with a step S11 in which the buffer controller 120 sees that a certain output buffer section has overflown in response to the associated buffer occupancy state signal line. Then, for the recovery of the output buffer section from the overflow, the buffer controller 120 interrupts the flow of cells into the output buffer section of interest. At the same time, the buffer controller 120 selects a spare cell buffer which is included in the input buffer section to prevent cells from being discarded. In the illustrative embodiment, the cell buffers 140_2 and 140_3 of each input buffer section are assumed to be spare cell buffers; the buffer controller 120 selects one of time (steps S12-S15). If both the cell buffers 140_2 and 140_3 are full (N, step S13), the buffer controller 120 sends a command to the address filter 110 to prevent it from gating cells addressed to the overflown output buffer section (step S17). ***This would cause such cells to be discarded. However, the input buffer section is provided with a number of cell buffers great enough to avoid such an occurrence.*** (emphasis added)

In other words, there are no flow-control requests made by, or executed by, any component described by Yamada. As clearly defined in the current application, and as well known to anyone familiar with networking systems, a flow-control request requests that transmission of messages through a communications medium to a port be discontinued. In Yamada, there is no discontinuing of receptions of cells by the input buffer. Instead, rather than using a single input buffer associated with each input signal line, Yamada's system employs multiple buffers to buffer incoming cells when an output buffer becomes filled or congested. Thus, Yamada simply describes a method for resorting to using multiple input and output buffers, rather than single input and output buffers, under high load. This has nothing to do with flow-control requests. Appellants' representative has failed to find the phrase "flow control" in Yamada.

The Examiner's rejections, based on Yamada, clearly state, and clearly depend on, the Examiner's incorrect conclusion that "Yamada et al., discloses a method for initiating flow control," when Yamada, in fact, does not employ flow control, but instead arranges for

sufficient buffering capacity so that internal buffering within the ATM switch does not overflow. There are many additional problems with the Examiner's citation of Yamada. For example, the Examiner states:

> . . . forwards a message descriptor referencing a communications packet received by a receiving port to one or more transmit queues, each transmit queue (fig. 1, Input Buffer Selection 100N and 101, recited in col. 3, lines 18-28) associated with a transmitting port (fig. 1, ATM Input Line 10N, recited in col. 3, lines 18-28) which transmits communications packets queued to the transmit queue.

Apparently, the Examiner has failed to appreciate the meaning of the phrase "transmit queue" as used in the current application and as well understood by those familiar with computer science and computer networking. In describing a network multiplexer, in the first paragraph of the background-of-the-invention section of the current application, on page 1 of the current application, the current application states: "Each port is associated with a receive queue that contains message descriptors pointing to memory locations in which received communications packets are stored, and are associated with transmit queues containing message descriptors that point to communications packets stored in memory for transmission by the port." Transmit queues are illustrated throughout the current application. One example is the transmit queue 708 shown in Figure 7. Note that a transmit queue stores messages for transmission by a port (702 in Figure 7) to external devices through a communications medium. Transmit queues 906-908 are shown in Figure 9, and the same illustration conventions are used in many subsequent figures. Please note that transmit queues 906-908 are identified as being transmit queues on lines 15-16 of page 12 of the current application, and are also labeled, in Figure 9, as "output queues." Those familiar with computer science well understand that transmit queues and output queues hold message descriptors that identify messages that are to be transmitted out from a device to some remote device. By contrast, the input buffer section (100_1) shown in Figure 1 of Yamada is clearly a type of receive buffer, and is not, by any stretch of the imagination, a transmit queue. In fact, Yamada explicitly states, on lines 22-25 of column 3: "The input buffer sections 100_1-100_N are associated one-to-one with ATM input lines 10_1-10_N, and each line temporarily stores cells from the associated one of the input lines 10_1-10_N." It can be clearly seen, in Figure 1, that the input lines 10_1-10_N are depicted as arrows pointed into the input buffer sections. Clearly, the Examiner has failed to understand the reference Yamada and has clearly mischaracterized the teachings of that reference. Furthermore, buffers are not queues.

Buffers are simply memory regions. Queues, by contrast, are data structures that order entries. Queues are described, in the current application, beginning on line 15 of page 10 with reference to Figure 8.

The Examiner continues, on page 7, with the mischaracterization of Yamada. The Examiner attempts to read the language "transmitting port" onto an ATM input line, when, in fact, an input line cannot possibly be described as a port of any kind, either receiving or transmitting. The Examiner attempts to read the phrase "high threshold" onto the "predetermined threshold" discussed on lines 33-38 of column 4. However, it is clear in claim 1 that the "high threshold" and "low threshold" associated with each transmitting port contain integer numbers to which the number of message descriptors currently contained in a transmit queue are compared, while the predetermined threshold mentioned in Yamada appears to be a ratio, which, as those familiar with simple mathematics well understand, generally a fractional number between 0 and 1. Furthermore, in claim 1, each transmitting port is provided with a high threshold and a low threshold, while the passage on lines 33-38 of column 4, cited by the Examiner, refers to a single predetermined threshold to which an occupancy ratio for a cell buffer is compared. A single predetermined threshold clearly does not constitute high and low thresholds associated with each transmit queue in a network multiplexer. There is no discussion in this section of Yamada of queues, transmitting ports, transmitting queues, or associating thresholds with particular transmitting ports.

The Examiner cites Homberg as teaching the step of claim 1 "when the transmit queue currently contains a maximum number of message descriptors, discarding the message descriptor." The Examiner cites, for example, lines 4-9 of Homberg's abstract. However, those lines of Homberg's abstract refer to "receive queues," as clearly stated by Homberg in the second line of the abstract. Receive queues are not transmit queues. A receive queue, for example, is shown as circular queue 710 in Figure 7 of the current application. Note that arrow points to the receive queue from port 702. Messages received by the port are queued to the receive queue. By contrast, a transmit queue, such as transmit queue 708, furnishes a message to a port for transmission. Appellants' representative has no idea why the Examiner is citing techniques applied to receive queues, in Homberg, for current claim language directed to transmit queues. The Examiner then cites lines 35-41 of column 2 for the step in claim 1: "when a message descriptor is queued to a transmit queue associated with a transmitting port, when the transmit queue currently contains a maximum number of message descriptors, discarding the message descriptor." Not only is the cited

passage of Homberg directed to receive queues, rather than transmit queues, the cited passage occurs in the context of data units received from external devices that are dropped only in the case that they are "eligible for discard." Otherwise, the data units are queued to the transmit queue, and already queued messages are dropped, to make room for them. Furthermore, dropping of the data units is not accompanied by a request transmitted to the receiving port to flow control the network to which the receiving port is connected. Indeed, data-message dropping is well known, as discussed in the background section of the current application. Homberg does not teach the discarding of message descriptors as a result of full transmit queues.

Yamada does not teach, mention, or suggest anything at all to do with "flow control." The Examiner has not cited any passage or figure in Homberg that teaches, mentions, or suggests any type of flow control. Homberg's data-dropping mechanism does not constitute flow control, by the above-provided definition of the phrase "flow control." For these reasons, neither Yamada, nor Homberg, nor a combination of Yamada and Homberg teaches, mentions, or suggests the type of method for initiating flow control in a network multiplexer, and do not teach, mention, or suggest any of the elements of claim 1. The rejection of claim 1 under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Homberg is unfounded, depends on mischaracterizations of the teachings of Yamada and Homberg, apparently rely on an attempt to arbitrarily redefine the term "flow control," and are entirely conclusory, without rational underpinning required for obviousness-type rejections, as discussed in M.P.E.P. §2141.

On page 2 of the Office Action the Examiner states:

> In response, the Examiner respectfully disagrees with the Applicant assertion of the applied references because the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, the Examiner asserts that combination of Yamada '820 and Homberg '802 when considered as a whole clearly teaches the Applicant claimed invention.

Appellants' representative does not fully understand what the Examiner is attempting to state, in this paragraph. However, Appellants' representative does wish to point out that, when two references, such as Yamada and Homberg, appear to be entirely unrelated to the currently

claimed invention, it is quite unlikely that any combination of those two references can possibly suggest a claimed invention to anyone, including those of ordinary skill in the art. Furthermore, when clear teachings of references are mischaracterized and when clearly defined phrases, such as "flow control," are arbitrarily redefined in order that the phrases can be read on cited references, the rejection must necessarily fail. Although examiners frequently invoke *In re Van Geuns* in apparent support of the erroneous assertion that examiners may arbitrarily redefine terms and phrases, without being constrained by the specification or other information, this is clearly not the case. However, the courts have consistently held that language used in a claim must be interpreted according to clear definitions in the specification and, lacking definition in the specification, to the well-known meaning of the phrase to those skilled in art, as for example:

> "Words of a claim 'are generally given their ordinary and customary meaning.'" Phillips v. AWH Corp., 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). A patentee, however, can "act as his own lexicographer to specifically define terms of a claim contrary to their ordinary meaning." Chef Am., Inc. v. Lamb-Weston, Inc., 358 F.3d 1371, 1374 (Fed. Cir. 2004) (citation omitted). "The inquiry into how a person of ordinary skill in the art understands a claim term provides an objective baseline from which to begin claim interpretation." Id. ***"Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification."*** Id. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." See Phillips, 415 F.3d at 1312-17. ***"Claims must be read in view of the specification, of which they are a part."*** Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (internal quotations omitted). ***Indeed, the specification is '[u]sually . . . dispositive" and "is the single best guide to the meaning of a disputed term."*** (emphasis added)

Of course, this principle is quite compatible with common sense and reason. Were explanations and definitions of claim terms and phrases required to be included in the claims themselves, the claims would run on for many tens of pages, and would be impossible to parse and interpret. It is true, according to *In Re Van Geuns*, that one cannot use a broad term, such as the word "fastener," in a claim, and then later seek to narrow the claim, or further limit the claim, to mean "sheet-metal screws" because only sheet-metal screws were disclosed in the specification. It is that type of limitation or narrowing to which the language "limitations from the specification are not read into the claims," is directed. It is absurd to suggest that *In Re Van Geuns* stands for the proposition that an Examiner can ignore the

definitions and explanations of claim terms and phrases in the specification, can ignore the well-known and well-understood meanings of the phrases and terms, and instead arbitrarily define claim terms and phrases.

M.P.E.P. § 2141, quoting *KSR v. Teleflex*, makes it clear that:

> "'[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.'"

In Appellants respectfully offered opinion, insisting that " sending a report condition to the input buffers when the occupancy of the output buffer exceeds the predetermined threshold as suggested in col. 4, lines 33-38 is equivalent to flow control request," without providing any rational analysis or support for this clearly incorrect assertion, is exactly the type of conclusory statement upon which rejections of obviousness cannot be sustained. As pointed out by Appellants in a previously filed response, bandwidth is guaranteed, in advance, in ATM networks. It is therefore not surprising or coincidental that none of the cited ATM-related references Yamada, Morgenstern, and Chiussi teach, mention, or suggest flow control. Furthermore, many of the Examiners attempts to read claim language onto terms, phrases, and passages of Yamada and Homberg are incorrect. Receive queues are not transmit queues, and a memory buffer is not necessarily a queue. In Appellants' respectfully offered opinion, a rejection based on incorrect statements must necessarily fail.

ISSUE 2

2. <u>The rejection of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Homberg and further in view Chiussi et al., U.S. Patent No. 5,701,292 ("Chiussi")</u>.

The rejection of claims 2-5 under 35 U.S.C. §103(a) are primarily based on Yamada and Homberg. As discussed with respect to Issue 1, above, Yamada and Homberg fail to teach, mention, or suggest that for which they are cited with respect to claim 1. The Examiner relies on the incorrect and conclusory statements made with respect to Yamada and Homberg in the rejections of claims 2-5, and thus a combination of Yamada and Homberg do not teach that for which the Examiner cites Yamada and Homberg in the rejections of claims 2-5. Furthermore, in citing Chiussi, the Examiner again appears to have completely misunderstood the reference, and mischaracterizes the teachings of the reference. For

example, on page 11 of the Office Action, the Examiner appears to read the phrase "message descriptor" onto the phrase "data rate information of sources." The cited passage of Chiussi, lines 52-59 of column 2, discusses hardware registers within a hardware device that contain transfer-rate information. In the first paragraph of the background-of-the-invention section of the current application, on page 1, message descriptors are discussed, as follows: "and are associated with transmit queues containing message descriptors that point to communications packets stored in memory for transmission by the port." The same paragraph discusses moving message descriptors from receive queues to transmit queues. In the first paragraph of page 9 of the current application, the current application mentions, "message descriptors that indicate the memory locations of stored communications packets." Appellants' representative does not understand how a message descriptor has anything at all do with a hardware register that contains data rate information. Data rate information is not a memory reference. Hardware registers are not moved between queues. A message descriptor is essentially a memory pointer, while the rate of data transmission is a number, stored in a hardware register, according to Chiussi, that probably expresses the number of bits, bytes, or packets transferred per second. The Examiner's statement makes no sense.

Similarly, the Examiner attempts to read the phrase "transmit queue" onto the phrase "queue register and transmitter" that does not even once occur in the cited passage of Chiussi on lines 47-56 of column 2. Those with cursory familiarity with computer science and computer hardware well understand that a transmitter is not a queue, and that the hardware registers that store data-transfer-rate values discussed in the cited passage of Chiussi have nothing whatsoever to do with transmit queues. Clearly, the Examiner has failed to understand Chiussi, and is simply reading claim language onto completely unrelated terms and phrases in a passage discussing completely unrelated concepts.

As yet another example, the Examiner appears to read the language "the number of message descriptors" onto the phrase "data source identifier" on lines 53-62 of column 2 of Chiussi, where in fact the phrase "data source identifier" refers to a hardware register that points to a data source having a data transfer rate equal or greater than some value, and has nothing whatsoever to do with a reference to a memory buffer holding a message. Appellants can find no support for the Examiner's various assertions regarding Chiussi in Chiussi, and believe that it should be quite clear that no combination of Yamada, Homberg, and Chiussi can possibly make obvious the currently claimed methods.

Again, conclusory statement and incorrect statements do not constitute a

rational underpinning for an obviousness-type rejection. Appellants therefore believe that the rejection of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Yamada in view of Homberg and further in view Chiussi are not supported and are unfounded.

ISSUE 3

3. The rejection of claims 1 and 6-10 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern et al., U.S. Patent No. 6,614,756 ("Morgenstern") in view of Robles et al., U.S. Patent No. 6,282,172 ("Robles").

Appellants have already responded, in detail, to the Examiner's citing of Morgenstern in the previously filed response. In response to Appellants' previously stated arguments, the Examiner replies, on page 4 of the Office Action, as follows:

> The Applicant alleged that Morgenstern '756 does not disclose transmit queue or receive queue associated with a transmitting port, a first and a second threshold associated with a transmit queue, no queue associated with the input ports, no port in Morgenstern '756 has a controller, transceivers, "memory not necessary a queue".
>
> In response the Examiner disagrees with the Applicant assertions because Morgenstern '756 discloses a plurality of network devices having one or more transmitters and receivers (col. 4, lines 59-64-transmitters and receivers constitute transceiving means; transmit queue for each port (col. 4, lines 37-38); a controller (fig. 3, Controller 50) configured to control the operation of the input and output ports (col. 7, lines 54-57); a receive queue (fig. 3, Input Port with the memory, recited in col. 7, lines 41-57). Morgenstern '756 further discloses a first and a second (high and low) (col. 5, lines 10-14, col. 5, lines 20-24, col. 9, lines 8-12). The queue has a memory component for storing data packet, frame or cell or PDU. That part of the Applicant argument is moot.

The passage on lines 59-64 of column 4 in Morgenstern discusses "a communication system network including a plurality of communication devices, each having one or more transmitters and receivers." Appellants' representative does not understand how this passage relates to anything in the current claims, which are directed to a network multiplexer. A communications system network is not a network multiplexer. Figure 1 of Morgenstern is described, by Morgenstern, as "a block diagram illustrating an example ATM network comprising a plurality of switches serving to connect a source and destination and station." Clearly, this network is not a network multiplexer. Ignoring the reference to Figure 1, the Examiner appears to be attempting to read the current claims onto an ATM switch, which is a

component of a communications network. The Examiner proceeds to cite various terms and phrases that do not appear to occur in the current claims as occurring in various portions of Morgenstern. Appellants' representative confesses to not understanding the point of this paragraph, or to what, in particular, the Examiner is attempting to refer, either in the current claims, or in Morgenstern. For example, The Examiner states: "Morgenstern '756 further discloses a first and a second (high and low) (col. 5, lines 10-14, col. 5, lines 20-24, col. 9, lines 8-12)." This statement obviously makes no sense. These referenced paragraphs of Morgenstern do discuss thresholds, but these thresholds are memory buffer pool thresholds, not high and low thresholds provided to each transmitting port, as discussed above. At the end of this paragraph, the Examiner states: "That part of the Appellant argument is moot." Appellants' representative has no idea what this statement means, or to what the Examiner is referring.

Again, Morgenstern does not discuss flow control. Discarding cells in an ATM switch is not flow control. The phrase "flow control" is discussed with respect to the first issue. Flow control involves preventing a transmitting device on a communications medium from transmitting messages or signals to a receiving device. Dropping packets or cells within an ATM switch is not, in any way, related to flow control. It is clear, from the final statement in the background-of-the-invention section of the current application, that discarding packets is not flow control: "Thus, designers, architects, and manufacturers of network multiplexers recognize the need for a simple method and system to selectively flow control the network media coupled to a network multiplexer in order to prevent communications packets from being discarded as a result of the exhaustion of internal network multiplexer resources." Clearly, one does not selectively flow control network media to prevent packets from being discarded, were discarding packets equivalent to flow control.

In rejecting claim 1, the Examiner states:

> Regarding claim 1, Morgenstern et al. discloses a method ("detecting a signaling congestion situation", recited in col. 4, lines 23-36) for initiating flow control ("detecting signaling congestion situation", recited in col. 4, lines 23-36) in a network multiplexer (fig. 1 and fig. 3, ATM Network with plurality of ATM Switches, recited in col. 3, lines 14-22) that forwards a message descriptor referencing a communications packet received by a receiving port to one or more transmit queues, each transmit queue (fig. 3, Memory 48, recited in col. 7, lines 41-60, Noted: each port transmit queue, col. 4. lines 37-40) associated with a transmitting port (fig. 3, Input Port 40, recited in col. 7, lines 41-57) which transmits communications packets

> ("transmitting signaling messages", recited in col. 7, lines 20-29) queued to the transmit queue ("storing of signal messages", recited in col. 7, lines 58-66, Noted: each port transmit queue, col. 4, lines 37-40), the method ("detecting a signaling congestion situation", recited in col. 4, lines 23-36) comprising: providing each transmitting port (fig. 3, Input Port 40, recited in col. 7, lines 41-60) in the network multiplexer (fig. 1 and fig. 3, ATM Network with plurality of ATM Switches, recited in col. 3, lines 14-22) with a high threshold ("first threshold and upper transmit upper queue", recited in col. 5, lines 10-20) and a low threshold ("second threshold", recited in col. 5, lines 20-34); when a message descriptor is queued to a transmit queue ("transmit queue with port", recited in col. 6, lines 7-15) associated with a transmitting port, when the transmit queue ("level of the transmit queue", recited in col. 4, lines 37-45) currently contains a maximum number of message descriptors ("level of messages passing the predetermined levels", recited in col. 4, lines 37-45), and when the transmit queue ("length of transmit queue exceeding a first predetermined level", recited in col. 4, lines 60 – col. 5, lines 9) currently contains a number of message descriptors equal to or greater than the high threshold ("first threshold and upper transmit upper queue", recited in col. 5, lines 10-20) of the associated transmitting port, sending a flow control request ("declaring a port to be in congested state", recited in col. 4, lines 60 - col. 5, lines 9 and "signaling notification", recited in col. 9, lines 51-58) receiving port that received the communications packet referenced by the queued message descriptor ("declaring a port to be in congested state", recited in col. 4, lines 60 – col. 5, lines 9 and "signaling notification", recited in col. 9, lines 51-58).

The Examiner attempts to read the phrase "flow control" onto "detecting signaling congestion situation" recited in lines 23-36 of column 4 of Morgenstern and "declaring a port to be in congested state" in the passage beginning on line 60 of column 4. Lines 23-36 of column 4 of Morgenstern read, as follows:

> The present invention is method of detecting a signaling congestion situation in a transmitter within a switch and for handling and recovering from the signaling congestion. The invention also comprises a method for detecting the absence of a signaling congestion situation and the processing thereof. The invention is applicable to ATM switching networks wherein a sliding window technique is used in transmitting signaling or any other type of messages from a source to a destination. The invention, however, is not limited to application only to ATM networks. It is applicable to any type of communications system whereby a siding window technique is used to transmit data from one point to another.

The passage that begins on line 60 of column 4 restates the above-quoted passage, and then discusses dropping of packets within the ATM switch during congestion. The cited passage of Morgenstern does not once mention flow control. Detecting congestion means exactly

what it states — namely, detecting when there is insufficient resources to buffer incoming messages prior to transmission. As discussed above, flow control refers to halting message transmission through a communications medium to a port attached to the communications medium. Nothing in the above-quoted passage is in any way related to flow control.

The Examiner cites, for the claim language "providing each transmitting port in the network multiplexer with a high threshold and a low threshold," lines 10-34 of column 5 of Morgenstern. While it does appear that there is a first threshold and a second threshold mentioned in this passage, the first threshold appears to be a single threshold for all transmit queues, and the second threshold is not associated in any way with transmit queues, but is instead is, as explicitly stated by Morgenstern, "a lower memory buffer pool threshold." The buffer pool is a centralized buffer pool allocated from a centralized memory (48 in Figure 3): "A portion of the memory 48 is designated for use as a centralized buffer pool for signaling messages (PDUs) and is of size M" (Morgenstern, column 7, lines 58-60). Thus, the two thresholds mentioned by Morgenstern do not, in any way, teach, mention, or suggest "providing each transmitting port in the network multiplexer with a high threshold and a low threshold." The discussion in columns 7-8 of Morgenstern reveal that two thresholds are not associated with each transmit queue.

The Examiner next reads the claim phrase "sending a flow control request" onto "declaring a port to be in a congested state," as recited in Morgenstern in a passage beginning on line 60 of column 4 and running to line 9 of column 5 and in a passage on lines 51-58 of column 9. However, neither of these passages in any way suggests any kind of flow control. The first passage simply states that, in a switch or other communications system implemented according to Morgenstern's disclosure, input ports do not route cells toward an output port that is in a congestion state. Similarly, the cited portion of column 9 mentions nothing about flow control. Morgenstern appears to be stating, in these passages, that an input port stops routing cells to a congested output port. In fact, beginning on line 46 of column 5, Morgenstern states that the input port may then attempt to route a newly arrived cell to a different output port that is not in a congestion state. This is not flow control. As discussed above, flow control involves an input port notifying external devices attached to communications medium that they need to stop sending messages to the input port. Flow control is well understood in networking. The cited passages of Morgenstern do not in any way discuss or suggest flow control. The input and output ports discussed in the cited passes of Morgenstern are all contained in a single ATM switch. The disclosed system reroutes cells

within the switch, but does not undertake flow control.

The Examiner reads the phrase "network multiplexer" onto Figures 1 and 3 of Morgenstern. As discussed above, a network is not a network multiplexer. While it is possible to draw analogies between ATM switches and network multiplexers, it is apparent that the Examiner fails to understand the distinction between a network and a network multiplexer.

The Examiner attempts to read the phrase "forwards a message descriptor referencing a communications packet received by a receiving port to one or more transmit queues" onto a memory component of an ATM switch. As discussed above, a message descriptor is a pointer, or reference, to a message stored in memory, and is not the memory itself. The Examiner attempts to read the phrase "transmitting port" onto input port (40 in Figure 3) of Morgenstern). As discussed above, transmitting ports transmit messages or signals out from a network multiplexer. An input port is, by contrast, a receiving port. Again, the Examiner attempts to read the phrase "sending a flow control request" to the phrase "declaring a port to be in congested state." However, as discussed above, in detail, a declaration of a port being in a congested state has nothing whatsoever to do with flow control. Flow control involves stopping a transmitting device from transmitting messages through a network or communications medium to a receiving device.

Morgenstern does not teach, mention, or suggest that for which Morgenstern is cited by the Examiner. Claim 6 includes similar language as included in claim 1, and Morgenstern fails to therefore teach, mention, or suggest that for which it is cited with respect to claim 6. As with the previously discussed issues, conclusory statements and incorrect statements do not constitute a rational underpinning for the rejections of claims 1 and 6-10 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern in view of Robles.

ISSUE 4

4. The rejections of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern in view of Robles and further in view of Chiussi.

As discussed above with respect to Issue 3, no Morgenstern fails to teach, mention, or suggest that for which it is cited as teaching. Claims 2-5 depend from claim 1, and therefore are not made obvious by a combination of Morgenstern and Robles for the same reasons that claim 1 is not made obvious by Morgenstern and Robles. The Examiner includes references to Chiussi, in support of the rejections, in much the same manner that the

Examiner included Chiussi in rejections of these claims being obvious over a combination of Yamada, Homberg, and Chiussi. However, Chiussi fails to teach, mention, or suggest that for which it is cited as teaching. As one example, the Examiner again, on page 22 of the Office Action, attempts to read the claim language "message descriptor" onto a hardware register containing data-transfer-rate information. Similarly, the Examiner again attempts to read the phrase "transmit queue" onto a hardware register and a hardware transmitter. As discussed above, hardware registers are not related to message descriptors, and a similar register and a transmitting device do not in any way constitute a transmit queue. These attempts to read claim language onto unrelated hardware registers and other such items from Chiussi are similar to the Examiner's previous attempts to read claim language onto unrelated hardware registers and other aspects of Chiussi and make no sense. As with the previously discussed issues, conclusory statements and incorrect statements do not constitute a rational underpinning for the rejections of claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Morgenstern in view of Robles and further in view of Chiussi.

CONCLUSION

The current claims are directed to a relatively easy-to-understand method and system. A network multiplexer, to which the current claims are directed, includes multiple ports, each associated with a receive queue and a transmit queue. This transmitting port is associated with a high threshold and a low threshold, and, when a message descriptor is queued to a transmit queue associated with a transmitting port, and that transmit queue contains a number of message descriptors equal to or greater than the high threshold associated with the transmitting port, a flow control request is sent to the receiving port that received the communications packet referenced by the quoted message descriptor.

As discussed above, Chiussi, Morgenstern, and Yamada are all directed to ATM switches. As discussed in a previously filed response and above, bandwidth is guaranteed, in advance, in ATM networks. It is therefore not coincidental that none of the cited references Yamada, Morgenstern, and Chiussi teaches, mentions, or suggests flow control or dropping packet to cells. Robles fails to teach, mention, or suggest transmit queues associated with transmitting ports, high and low thresholds associated with transmitting ports, and therefore fails to teach, mention, or suggest the currently claimed invention. In Appellants' respectfully offered opinion, the Examiner's 103(a) rejections are unfounded,

depend on mischaracterization of the cited references, are conclusory in nature, do not provide a rational underpinning for an assertion of obviousness as required by the recent Supreme Court decision *KSR v. Teleflex*, as discussed in M.P.E.P. §2141, and therefore necessarily fail.

Appellants respectfully submit that all statutory requirements are met and that the present application is allowable over all the references of record. Therefore, Appellants respectfully request that the present application be passed to issue.

Respectfully submitted,
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CLAIMS APPENDIX

1. A method for initiating flow control in a network multiplexer that forwards a message descriptor referencing a communications packet received by a receiving port to one or more transmit queues, each transmit queue associated with a transmitting port which transmits communications packets queued to the transmit queue, the method comprising:

providing each transmitting port in the network multiplexer with a high threshold and a low threshold;

when a message descriptor is queued to a transmit queue associated with a transmitting port,

when the transmit queue currently contains a maximum number of message descriptors, discarding the message descriptor, and

when the transmit queue currently contains a number of message descriptors equal to or greater than the high threshold of the associated transmitting port, sending a flow control request to the receiving port that received the communications packet referenced by the queued message descriptor.

2. The method of claim 1 further including:

when a message descriptor is queued to a transmit queue associated with a transmitting port,

when the transmit queue currently contains a number of message descriptors greater than or equal to the low threshold of the associated transmitting port, but the number of message descriptors contained in the transmit queue exceeded or equaled the high threshold of the associated transmitting port more recently than the number of message descriptors contained in the transmit queue was equal to the low threshold of the associated transmitting port, sending a flow control request to the receiving port that received the communications packet referenced by the queued message descriptor.

3. The method of claim 1 further including:

when a transmitting port transmits a packet referenced by a message descriptor to a destination port,

releasing the message descriptor, and

when the destination port currently contains a number of queued message descriptors equal to one less than the destination port's low threshold, sending a release flow control request to any receiving ports to which a flow control request was sent while the transmit queue contained a number of message descriptors equal to or greater than the high threshold of the associated transmitting port.

4. The method of claim 2 further including:

when a transmitting port transmits a packet referenced by a message descriptor to a destination port,

releasing the message descriptor, and

when the destination port currently contains a number of queued message descriptors one less than the destination port's low threshold, sending a release flow control request to any receiving ports to which a flow control request was sent while the transmit queue contained a number of message descriptors greater than or equal to the low threshold of the associated transmitting port.

5. The method of claim 4 further including:

when a receiving port is flow controlled and receives a number of release flow control requests equal to the number of received flow control requests,

releasing flow control by the receiving port.

6. A network multiplexer system that links physically separate network media by forwarding packets received from each network medium to a number of network media, the network multiplexer system comprising:

a number of ports, each port having a transceiver and a communications controller;

a memory;

an internal bus for transferring packets from ports to memory and from memory to ports;

a receive queue and a transmit queue associated with each port that contain message descriptors that each references a communications packet stored in memory;

a high threshold and a low threshold associated with each transmit queue;

an indication of ports to which flow control requests have been made associated with each port; and

an indication of the number of flow control requests made to a port associated with each port.

7. The network multiplexer of claim 6 wherein, when a message descriptor is forwarded to a port for transmission, and when the transmit queue of the port is full, the message descriptor is dropped.

8. The network multiplexer of claim 6 wherein, when a message descriptor is forwarded to a port for transmission, and when the transmit queue of the port contains a number of message descriptors greater than or equal to the high threshold associated with the port, a flow control request is sent to the port that received the communications packet referenced by the message descriptor and a indication that a flow control request has been sent to the port that received the communications packet is saved by the port to which the message descriptor is forwarded.

9. The network multiplexer of claim 6 wherein, when a message descriptor is forwarded to a port for transmission, and when the transmit queue of the port has contained a number of message descriptors greater than or equal to the high threshold associated with the port more recently than the transmit queue of the port has contained a number of message descriptors less than the low threshold associated with the port, a flow control request is sent to the port that received the communications packet referenced by the message descriptor and a indication that a flow control request has been sent to the port that received the communications packet is saved by the port to which the message descriptor is forwarded.

10. The network multiplexer of claim 6 wherein, when a port removes a message descriptor from the transmit queue associated with the port, and when the number of messages contained in the transmit queue currently equal one less than the low threshold associated with the port, a release flow control message is sent to each port referenced by indications saved by the port.

EVIDENCE APPENDIX

None.

RELATED PROCEEDINGS APPENDIX

None.